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METEOROLOGICAL DATA REPORT

AEROBEE NASA 4.144 DG (NRL NB 3.165)  
(18 July 1966)

BY

MARJORIE MCLARDIE HOTDALE

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DA Task IV650212A127-02

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# ABSTRACT

Meteorological data gathered for the launching of Aerobee NASA 4.144 DG (NRL NB 3.165) are presented for the National Aeronautics and Space Administration and the U. S. Naval Research Laboratory and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form.

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## INTRODUCTION

Aerobee NASA 4.144 DG (NRL NB 3.165) was launched by Naval Ordnance Missile Test Facility personnel, White Sands Missile Range (WSMR), New Mexico, at 2036 hours MST, 18 July 1966.

Meteorological data used in conjunction with theoretical calculations to predict rocket impact were collected by the Meteorological Support Division, Atmospheric Sciences Laboratory, White Sands Missile Range, New Mexico. The Ballistic Meteorologists for this firing were Marjorie M. Hoidale and Ivan I. Layton.

## DISCUSSION

Wind data for the first 4,000 feet above the surface were obtained from a Double-Theodolite Wind Velocity Computer System (1). Balloons released at the launch site were observed and tracked from a 2,000-foot baseline. Continuous angular data were transmitted from two electrically instrumented theodolites to a computer where the data were reduced to obtain a velocity-vs-height relationship. The computer output drives two recorders which trace north-south and east-west components on a specially designed wind velocity computer ballistic chart. It is possible to read directly from the chart both the mean wind component values and the mean ballistic wind components in the various ballistic layers.

Temperature, pressure and humidity data, along with upper wind data from 4,000 to approximately 100,000 feet above the surface, were obtained from standard rawinsonde operations.

Mean wind component values in each ballistic zone were determined from vertical cross sections by equal-area method.

Data appearing in Tables X, XI, and XII, are based on the L. D. Duncan (2) theory. The "Predicted Impact" includes, when applicable, an adjustment of impact based on the experience of the Ballistic Meteorologists and the forecast of firing time wind conditions.

#### REFERENCES

1. "Double-Theodolite Wind Velocity Computer", UNCLASSIFIED, U. S. Army Signal Research and Development Laboratory, Fort Monmouth, New Jersey, July 1959.
2. Duncan, L. D. and R. J. Ensey, November 1964: "Six Degree of Freedom Digital Simulation Model for Unguided Fin-Stabilized Rockets". ERDA-196, Environmental Sciences Directorate, United States Army Electronics Research and Development Activity, White Sands Missile Range, New Mexico.

PAYLOAD	Includes Nosecone Weight	340.5	Pounds
* UNIT WIND EFFECT	Cross	3.22	Miles/MPH
	Range	3.79	Miles/MPH
TOWER TILT EFFECT		17.03	Miles/Degree
BURJOUT	Velocity	5,270	Feet/Second
	Altitude	120,146	Feet MSL
	Time	51.8	Seconds
PEAK	Altitude	105.7	Miles MSL
	Time	222.0	Seconds
TOTAL FLIGHT TIME		480.0	Seconds
CORIOLIS EFFECT	West	4.75	Miles

TABLE I. THEORETICAL ROCKET PERFORMANCE VALUES  
AEROBEE NASA 4.144 DG (NRL NB 3.165)

\* An empirical correction (85 percent of the total) has been made to the cross-unit wind effect. This correction was determined from statistical studies.



LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTOR
143- 250	.185
250- 400	.115
400- 600	.100
600- 800	.062
800-1200	.053
1200-1600	.031
1600-2000	.025
2000-2500	.029
2500-3000	.023

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTOR
3000- 3500	.019
3500- 4000	.016
4000- 5000	.031
5000-10000	.096
10000-15000	.056
15000-20000	.033
20000-25000	.023
25000-30000	.017
30000-35000	.014

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTOR
35000- 40000	.009
40000- 45000	.006
45000- 50000	.012
50000- 60000	.010
60000- 70000	.009
70000- 80000	.007
80000- 90000	.008
90000-100000	.010

TABLE II. BALLISTIC FACTORS  
AEROBEE NASA 4.144 DG (NRL NB 3.165)

TIME IN MINUTES	ANEMOMETER-MEASURED WIND	
	Speed (Knots)	Direction (Degrees)
T - 15	12.5	145
T - 10	12.5	146
T - 5	13.0	142
T - Time	14.0	145
T + 5	14.0	145
T + 10	14.0	144
T + 15	14.0	142

TABLE III. ANEMOMETER-MEASURED WIND SPEED AND DIRECTION  
AEROBEE NASA 4.144 DG (NRL NB 3.165)

NOTE: Wind speeds and directions are 5-minute averages  
centered at indicated times.

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN MILES PER HOUR											
	1 1745 MST		2 1805 MST		3 1835 MST		4 1855 MST		5 1920 MST		6 1935 MST	
	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W
143- 250	3.0S	0.5E	1.5S	4.5E	6.0S	8.5E	6.5S	6.5E	7.5S	8.5E	7.0S	8.5E
250- 400	1.0	3.0	0.5	4.5	4.5	9.5	5.0	6.0	6.5	11.0	9.0	11.5
400- 600	0.5N	7.5	0.5	4.0	5.0	7.0	7.0	6.5	6.5	12.5	10.5	15.0
600- 800	0.5	6.0	2.0	4.5	7.0	7.0	10.5	6.5	7.0	11.0	11.5	16.0
800-1200	3.0S	7.0	4.5	4.5	6.5	8.0	9.0	5.5	6.5	10.5	9.5	14.0
1200-1600	6.0	8.5	5.0	6.5	11.0	7.0	7.0	5.5	5.5	8.5	11.0	12.5
1600-2000	5.0	9.0	5.5	7.0	11.0	7.5	5.5	5.0	8.5	9.0	6.5	7.0
2000-2500	4.5	4.5	6.0	5.0	5.0	6.5	7.5	5.0	8.0	5.0	6.5	7.5
2500-3000	4.0	6.0	6.0	6.0	4.5	5.0	7.5	4.0	7.5	4.5	7.0	5.5
3000-3500	6.0	6.0	5.0	4.0	3.0	4.0	3.5	1.5	7.5	4.0	7.5	7.5
3500-4000	7.0	5.5	5.5	3.5	2.5	2.5	4.0	1.0	9.0	5.0	8.5	6.0

TABLE IV. PILOT-BALLOON-MEASURED WIND DATA (DOUBLE THEODOLITE METHOD)  
AEROBEE NASA 4.144 DG (NRL NB 3.165)

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN MILES PER HOUR											
	7 1950 MST		8 2005 MST		9 2018 MST		10 2025 MST		11 2030 MST		12 2037 MST	
	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W
143- 250	8.0S	8.0E	8.5S	9.5E	8.5S	10.5E	10.5S	8.5E	9.5S	10.0E	8.0S	10.0E
250- 400	7.5	11.5	8.5	13.0	8.5	13.0	11.0	13.5	11.0	13.5	7.5	14.5
400- 600	8.5	15.0	9.0	12.5	10.5	14.0	10.5	14.5	13.5	14.5	11.5	19.0
600- 800	10.0	15.5	11.0	14.5	11.0	12.0	9.5	9.0	10.0	11.5	14.0	14.5
800-1200	9.5	13.0	10.0	10.5	11.5	8.5	10.5	8.0	14.0	11.0	14.0	12.5
1200-1600	10.0	12.0	12.0	11.5	13.5	8.0	12.5	5.5	13.5	7.5	18.5	8.0
1600-2000	8.0	7.0	9.5	7.5	12.5	6.5	15.5	6.0	12.5	8.0	12.5	6.5
2000-2500	6.5	5.0	7.5	5.5	12.0	5.5	11.0	7.5	12.0	6.5	16.5	11.0
2500-3000	7.5	5.5	11.5	5.5	12.0	5.0	14.0	6.5	15.5	8.5	16.0	6.0
3000-3500	8.0	5.5	14.0	7.0	7.5	1.0W	14.5	5.5	6.0	0.0	7.0	2.0W
3500-4000	10.5	6.0	16.5	7.0	M*	M	M	M	15.0	3.0E	7.0	2.0

TABLE IV. PILOT-BALLOON-MEASURED WIND DATA  
(DOUBLE-THEODOLITE METHOD)  
AEROBEE NASA 4.144 DG (NRL NB 3.165)

\* M = Missing

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN KNOTS	
	1 1945 MST	
	N-S	E-W
4000- 5000	1.5S	5.0W
5000-10000	5.0N	1.0
10000-15000	10.5	4.0E
15000-20000	2.5	13.0

TABLE V. UPPER AIR DATA  
(4,000-20,000 FT)  
AEROBEE NASA 4.144 DG  
(NRL NB 3.165)

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LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN KNOTS					
	1 1445 MST		2 1730 MST		3 2045 MST	
	N-S	E-W	N-S	E-W	N-S	E-W
4000- 5000	2.5S	3.0E	0.5S	2.0E	10.0S	0.0
5000- 10000	1.0N	7.0	1.5	5.0	1.0N	6.0E
10000- 15000	7.0	8.5	6.5N	11.0	7.5	9.0
15000- 20000	1.5	8.0	1.5	9.0	0.0	17.0
20000- 25000	6.0S	10.5	2.5S	8.0	6.5S	11.0
25000- 30000	0.0	14.0	0.0	15.0	5.0	14.0
30000- 35000	2.5N	15.0	0.0	13.0	6.0N	16.0
35000- 40000	2.5	13.0	0.0	13.0	0.0	17.0
40000- 45000	0.0	9.0	5.0S	13.0	7.0S	19.5
45000- 50000	7.0S	19.0	5.0	13.0	13.0	15.5
50000- 60000	3.5	18.5	0.0	17.0	3.0N	17.5
60000- 70000	4.0	21.5	0.0	20.0	0.0	23.0
70000- 80000	0.0	28.0	0.0	27.0	0.0	28.0
80000- 90000	0.0	26.0	0.0	22.0	5.5N	31.5
90000-100000	0.0	28.0	0.0	34.0	0.0	28.0

TABLE VI. UPPER AIR DATA (4,000-100,000 FT)  
AEROBEE NASA 4.144 DG (NRL NB 3.165)

# UPPER AIR DATA

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 1445 HRS MST  
ASCENSION NO. 541

WSTM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

3919906  
WHITE SANDS SITE  
TABLE VII

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		DIRECTION DEGREES(TN)	WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS		SPEED KNOTS		
3989.0	878.1	34.8	13.1	27.0	987.1	685.5		120.0	9.9		1.000280
4000.0	877.8	34.8	13.0	26.8	986.9	685.4		120.0	9.9		1.000279
4500.0	863.1	32.7	5.4	18.1	979.3	682.3		122.3	9.5		1.000254
5000.0	848.2	31.1	5.8	20.3	967.2	680.6		124.5	9.1		1.000253
5500.0	833.6	29.6	6.1	22.7	955.3	678.9		126.8	8.7		1.000252
6000.0	819.3	28.0	6.2	25.1	943.6	677.2		129.0	8.2		1.000250
6500.0	805.1	26.5	6.2	27.4	932.1	675.5		131.3	7.8		1.000248
7000.0	791.3	24.9	6.1	29.8	920.8	673.7		129.7	6.4		1.000245
7500.0	777.6	23.3	5.8	32.1	909.7	672.0		126.6	4.5		1.000242
8000.0	764.2	21.8	5.5	34.5	898.8	670.2		121.0	3.5		1.000239
8500.0	751.1	20.2	5.0	36.8	888.1	668.4		113.9	2.6		1.000236
9000.0	738.1	18.7	4.5	39.2	877.5	666.6		97.4	2.8		1.000233
9500.0	725.4	17.1	4.0	41.6	867.1	664.8		83.7	3.3		1.000230
10000.0	712.5	15.8	2.8	41.6	855.7	663.2		75.5	4.2		1.000225
10500.0	699.8	14.6	1.6	41.1	844.2	661.8		71.1	5.2		1.000219
11000.0	687.3	13.4	0.3	40.6	832.8	660.3		68.8	6.2		1.000214
11500.0	675.1	12.2	-0.9	40.1	821.6	658.8		70.1	6.6		1.000210
12000.0	662.8	10.8	-1.4	42.4	810.7	657.2		71.0	7.2		1.000206
12500.0	650.8	9.4	-1.7	45.6	800.0	655.5		71.3	7.9		1.000204
13000.0	638.9	8.0	-2.1	48.8	789.5	653.8		70.7	8.4		1.000201
13500.0	627.3	6.5	-2.6	52.1	779.2	652.2		69.4	8.8		1.000198
14000.0	615.8	5.5	-4.5	48.4	767.9	650.8		64.0	9.1		1.000192
14500.0	604.4	4.6	-7.2	41.9	756.4	649.7		57.8	9.6		1.000186
15000.0	593.2	3.8	-9.9	36.2	745.0	648.6		50.3	10.2		1.000180
15500.0	582.2	2.9	-11.9	32.9	733.7	647.4		43.8	11.2		1.000176
16000.0	571.3	2.0	-14.0	29.6	722.5	646.3		37.8	12.5		1.000171
16500.0	560.6	1.1	-16.2	26.3	711.5	645.2		35.7	13.6		1.000167
17000.0	550.1	0.2	-18.6	23.0	700.6	644.1		34.7	14.0		1.000163
17500.0	539.8	-0.7	-17.1	27.7	689.4	643.1		35.2	13.4		1.000162
18000.0	529.6	-1.5	-14.7	35.9	678.3	642.2		38.7	12.1		1.000161

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 1445 HRS MST  
ASCENSION NO. 541

UPPER AIR DATA  
3919906  
WHITE SANDS SITE  
TABLE VII (Cont)

WSTM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
18500.0	519.6	-2.3	-12.9	44.0	667.3	641.3	43.3	10.8	1.000160
19000.0	509.7	-3.3	-17.3	33.1	657.3	640.0	49.6	9.3	1.000155
19500.0	500.0	-4.2	-12.9	50.8	646.6	639.1	56.8	8.4	1.000156
20000.0	490.4	-5.2	-19.8	30.8	637.1	637.7	65.2	8.2	1.000149
20500.0	480.9	-6.3	-18.6	37.3	627.2	636.4	71.1	7.9	1.000147
21000.0	471.7	-7.4	-17.7	43.8	617.6	635.1	75.3	7.5	1.000146
21500.0	462.5	-8.5	-17.1	50.3	608.1	633.9	81.4	7.5	1.000144
22000.0	453.6	-9.6	-16.6	56.8	598.8	632.6	88.4	7.6	1.000143
22500.0	444.7	-10.7	-17.5	57.6	589.6	631.3	95.8	7.7	1.000140
23000.0	436.0	-11.7	-18.6	57.1	580.5	629.9	103.3	7.8	1.000137
23500.0	427.5	-12.0	-23.5	38.1	569.9	629.5	108.9	8.3	1.000132
24000.0	419.1	-12.4	-29.0	23.9	559.7	628.9	113.6	8.9	1.000128
24500.0	410.6	-13.5	-30.5	22.6	550.7	627.6	115.3	9.2	1.000125
25000.0	402.4	-14.6	-31.1	23.2	541.9	626.3	114.8	9.3	1.000123
25500.0	394.3	-15.7	-31.8	23.9	533.3	624.9	111.7	9.0	1.000121
26000.0	386.3	-16.8	-32.5	24.5	524.8	623.6	113.0	9.6	1.000119
26500.0	378.5	-17.9	-33.1	25.2	516.4	622.3	116.0	10.6	1.000117
27000.0	370.9	-19.0	-33.8	25.8	508.2	620.9	117.7	12.5	1.000115
27500.0	363.4	-20.1	-34.6	26.5	500.1	619.6	119.3	14.2	1.000113
28000.0	356.1	-21.2	-35.3	27.1	492.2	618.2	120.1	15.2	1.000111
28500.0	348.9	-22.3	-36.0	27.8	484.4	616.8	119.1	15.8	1.000110
29000.0	341.9	-23.4	-36.7	28.4	476.7	615.5	113.3	15.4	1.000108
29500.0	335.0	-24.5	-37.4	29.3	469.2	614.1	107.1	15.0	1.000106
30000.0	328.0	-25.7	-37.9	31.2	461.6	612.6	99.6	14.3	1.000104
30500.0	321.1	-26.9	-38.4	33.1	454.2	611.1	92.3	14.1	1.000103
31000.0	314.4	-28.1	-38.9	35.0	446.9	609.6	85.5	15.0	1.000101
31500.0	307.9	-29.3	-39.5	36.9	439.7	608.1	80.4	15.9	1.000099
32000.0	301.4	-30.5	-40.5	37.3	432.6	606.7	79.7	16.8	1.000097
32500.0	294.9	-31.6	-42.0	35.5	425.4	605.2	79.0	17.4	1.000096
33000.0	288.6	-32.8	-43.5	33.6	418.3	603.8	78.2	17.6	1.000094

# UPPER AIR DATA

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 1445 HRS MST  
ASCENSION NO. 541

WSTM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

3919906  
WHITE SANDS SITE  
TABLE VII (Cont)

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
33500.0	282.5	-33.9	-45.1	31.8	411.3	602.3		77.5	17.6	1.000092
34000.0	276.4	-35.0	-46.6	30.0	404.5	600.9		77.7	16.9	1.000091
34500.0	270.5	-36.2	-48.2	28.2	397.7	599.4		77.5	16.3	1.000089
35000.0	264.7	-37.4	-50.5	24.4	391.1	597.9		75.3	15.4	1.000087
35500.0	258.8	-38.6	-53.0	20.6**	384.4	596.4		73.1	14.6	1.000086
36000.0	253.1	-39.8	-55.8	16.7**	377.9	594.8		72.6	14.2	1.000084
36500.0	247.5	-41.0	-58.9	12.8**	371.5	593.3		72.1	13.7	1.000083
37000.0	242.0	-42.2	-62.7	8.9**	365.2	591.7		75.2	13.8	1.000081
37500.0	236.7	-43.4	-67.8	5.0**	359.0	590.2		78.5	13.9	1.000080
38000.0	231.5	-44.7	-78.7	1.1**	352.9	588.6		83.3	14.4	1.000079
38500.0	226.2	-45.6	0.	-0. **	346.5	587.3		88.3	15.0	1.000077
39000.0	221.1	-46.5	0.	-0. **	339.9	586.2		91.0	14.9	1.000076
39500.0	216.1	-47.4	0.	-0. **	333.5	585.0		93.2	14.5	1.000074
40000.0	211.2	-48.3	0.	-0. **	327.2	583.9		91.2	13.6	1.000073
40500.0	206.4	-49.2	0.	-0. **	321.0	582.8		88.0	12.6	1.000071
41000.0	201.7	-50.1	0.	-0. **	315.1	581.5		84.8	11.6	1.000070
41500.0	196.9	-51.4	0.	-0. **	309.3	579.9		81.7	10.6	1.000069
42000.0	192.3	-52.6	0.	-0. **	303.7	578.3		83.4	10.0	1.000068
42500.0	187.7	-53.8	0.	-0. **	298.2	576.7		86.5	9.6	1.000066
43000.0	183.3	-55.0	0.	-0. **	292.8	575.1		91.7	9.3	1.000065
43500.0	179.0	-56.2	0.	-0. **	287.5	573.5		98.6	9.0	1.000064
44000.0	174.8	-57.4	0.	-0. **	282.3	571.9		103.9	8.8	1.000063
44500.0	170.7	-58.6	0.	-0. **	277.2	570.3		104.5	8.7	1.000062
45000.0	166.7	-59.8	0.	-0. **	272.2	568.7		105.1	8.6	1.000061
45500.0	162.7	-61.1	0.	-0. **	267.3	567.1		99.5	9.0	1.000060
46000.0	158.8	-62.1	0.	-0. **	262.2	565.6		92.3	9.7	1.000058
46500.0	154.9	-63.1	0.	-0. **	257.0	564.3		86.9	11.1	1.000057
47000.0	151.1	-64.1	0.	-0. **	251.9	562.9		84.1	13.5	1.000056
47500.0	147.4	-65.1	0.	-0. **	246.9	561.6		81.8	15.8	1.000055
48000.0	143.8	-66.1	0.	-0. **	242.0	560.3		82.5	17.3	1.000054

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.



STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 1445 HRS MST  
ASCENSION NO. 541

UPPER AIR DATA  
3919906  
WHITE SANDS SITE  
TABLE VII (Cont)

WSTM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	TEMPERATURE DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION (TN) DEGREES	SPEED KNOTS	INDEX OF REFRACTION
48500.0	140.3	-67.1	0.	-0. **	237.2	558.9	83.3	18.7	1.000053
49000.0	136.8	-67.8	0.	-0. **	232.0	558.0	88.4	19.4	1.000052
49500.0	133.3	-68.4	0.	-0. **	226.9	557.1	93.5	20.0	1.000051
50000.0	129.9	-69.1	0.	-0. **	221.9	556.2	99.0	19.2	1.000049
50500.0	126.7	-69.7	0.	-0. **	216.9	555.3	104.6	18.3	1.000048
51000.0	123.5	-70.4	0.	-0. **	212.1	554.4	109.4	18.2	1.000047
51500.0	120.3	-71.0	0.	-0. **	207.4	553.6	113.9	18.1	1.000046
52000.0	117.3	-71.7	0.	-0. **	202.8	552.7	117.3	18.6	1.000045
52500.0	114.3	-72.3	0.	-0. **	198.4	551.8	119.2	19.6	1.000044
53000.0	111.4	-73.0	0.	-0. **	194.0	550.9	121.2	20.5	1.000043
53500.0	108.6	-73.6	0.	-0. **	189.7	550.0	123.3	20.5	1.000042
54000.0	105.9	-74.3	0.	-0. **	185.5	549.1	125.2	20.4	1.000041
54500.0	103.2	-73.9	0.	-0. **	180.5	549.6	121.4	20.0	1.000040
55000.0	100.6	-73.1	0.	-0. **	175.2	550.7	117.6	19.6	1.000039
55500.0	98.0	-72.3	0.	-0. **	170.0	551.9	115.0	18.8	1.000038
56000.0	95.6	-71.4	0.	-0. **	165.1	553.0	112.3	18.0	1.000037
56500.0	93.1	-70.6	0.	-0. **	160.2	554.2	113.5	19.0	1.000036
57000.0	90.8	-69.8	0.	-0. **	155.5	555.3	115.2	20.3	1.000035
57500.0	88.5	-68.9	0.	-0. **	151.0	556.4	117.4	21.1	1.000034
58000.0	86.3	-68.1	0.	-0. **	146.6	557.6	120.0	21.5	1.000033
58500.0	84.1	-67.4	0.	-0. **	142.5	558.5	121.8	21.6	1.000032
59000.0	82.1	-66.7	0.	-0. **	138.5	559.4	119.5	20.5	1.000031
59500.0	80.1	-66.1	0.	-0. **	134.7	560.4	117.2	19.3	1.000030
60000.0	78.1	-65.4	0.	-0. **	131.0	561.3	104.6	17.4	1.000029
60500.0	76.2	-64.7	0.	-0. **	127.3	562.2	89.4	15.3	1.000028
61000.0	74.3	-64.0	0.	-0. **	123.8	563.1	76.9	15.0	1.000028
61500.0	72.5	-63.3	0.	-0. **	120.4	564.0	66.5	16.1	1.000027
62000.0	70.7	-62.7	0.	-0. **	117.1	564.9	59.8	16.8	1.000026
62500.0	69.0	-62.0	0.	-0. **	113.8	565.8	59.9	16.7	1.000025
63000.0	67.3	-61.3	0.	-0. **	110.7	566.7	60.9	16.8	1.000025

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\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
 18 JULY 66  
 ASCENSION NO. 541

UPPER AIR DATA  
 3919906  
 WHITE SANDS SITE  
 TABLE VII (Cont)

WSTM SITE COORDINATES  
 E 488,580 FEET  
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS			
63500.0	65.7	-60.9	0.	-0. **	107.8	567.3		67.6	18.0	1.000024
64000.0	64.1	-60.5	0.	-0. **	105.1	567.7		74.4	19.1	1.000023
64500.0	62.6	-60.2	0.	-0. **	102.4	568.2		81.2	20.3	1.000023
65000.0	61.1	-59.8	0.	-0. **	99.8	568.7		88.0	21.6	1.000022
65500.0	59.7	-59.5	0.	-0. **	97.3	569.2		91.8	22.6	1.000022
66000.0	58.2	-59.1	0.	-0. **	94.8	569.7		93.6	23.5	1.000021
66500.0	56.9	-58.8	0.	-0. **	92.4	570.1		95.6	24.0	1.000021
67000.0	55.5	-58.4	0.	-0. **	90.0	570.6		98.1	23.3	1.000020
67500.0	54.2	-58.0	0.	-0. **	87.8	571.1		100.7	22.7	1.000020
68000.0	52.9	-57.7	0.	-0. **	85.5	571.6		101.5	21.8	1.000019
68500.0	51.6	-57.3	0.	-0. **	83.4	572.0		102.1	20.9	1.000019
69000.0	50.4	-57.0	0.	-0. **	81.2	572.5		100.6	20.9	1.000018
69500.0	49.2	-56.6	0.	-0. **	79.2	573.0		97.8	21.4	1.000018
70000.0	48.0	-56.2	0.	-0. **	77.2	573.5		95.1	22.0	1.000017
70500.0	46.9	-55.9	0.	-0. **	75.2	573.9		92.6	23.0	1.000017
71000.0	45.8	-55.6	0.	-0. **	73.3	574.4		90.1	24.0	1.000016
71500.0	44.7	-55.3	0.	-0. **	71.5	574.7		89.2	24.9	1.000016
72000.0	43.7	-55.1	0.	-0. **	69.8	575.0		88.5	25.8	1.000016
72500.0	42.7	-54.8	0.	-0. **	68.1	575.4		88.9	26.4	1.000015
73000.0	41.7	-54.6	0.	-0. **	66.5	575.7		90.6	26.5	1.000015
73500.0	40.7	-54.3	0.	-0. **	64.9	576.0		92.3	26.6	1.000014
74000.0	39.8	-54.1	0.	-0. **	63.3	576.4		94.1	26.7	1.000014
74500.0	38.9	-53.8	0.	-0. **	61.8	576.7		95.9	26.8	1.000014
75000.0	38.0	-53.6	0.	-0. **	60.3	577.0		96.6	26.8	1.000013
75500.0	37.1	-53.3	0.	-0. **	58.8	577.3		96.2	26.7	1.000013
76000.0	36.3	-53.1	0.	-0. **	57.4	577.7		95.8	26.7	1.000013
76500.0	35.4	-52.8	0.	-0. **	56.0	578.0		95.3	27.4	1.000012
77000.0	34.6	-52.6	0.	-0. **	54.7	578.3		94.9	28.1	1.000012
77500.0	33.8	-52.3	0.	-0. **	53.3	578.7		93.6	28.9	1.000012
78000.0	33.0	-52.1	0.	-0. **	52.1	579.0		91.8	29.7	1.000012

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 1445 HRS MST  
ASCENSION NO. 541

UPPER AIR DATA  
3919906  
WHITE SANDS SITE  
TABLE VII (Cont)

WSTM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE				DIRECTION DEGREES(TN)	SPEED KNOTS	
78500.0	32.3	-51.8	0.	-0. **	50.8	579.3	90.3	30.6	1.000011
79000.0	31.5	-51.6	0.	-0. **	49.6	579.6	91.2	31.1	1.000011
79500.0	30.8	-51.3	0.	-0. **	48.4	580.0	92.2	31.6	1.000011
80000.0	30.1	-51.1	0.	-0. **	47.2	580.3	92.2	31.6	1.000011
80500.0	29.4	-50.8	0.	-0. **	46.1	580.6	91.7	31.4	1.000010
81000.0	28.7	-50.6	0.	-0. **	44.9	580.9	91.5	30.9	1.000010
81500.0	28.1	-50.3	0.	-0. **	43.9	581.3	93.0	29.3	1.000010
82000.0	27.4	-50.1	0.	-0. **	42.8	581.6	94.4	27.7	1.000010
82500.0	26.8	-49.8	0.	-0. **	41.8	581.9	93.9	26.1	1.000009
83000.0	26.2	-49.6	0.	-0. **	40.8	582.2	91.8	24.7	1.000009
83500.0	25.6	-49.3	0.	-0. **	39.8	582.6	89.7	23.2	1.000009
84000.0	25.0	-49.1	0.	-0. **	38.8	582.9	90.1	22.9	1.000009
84500.0	24.4	-48.8	0.	-0. **	37.9	583.2	91.3	22.9	1.000008
85000.0	23.8	-48.6	0.	-0. **	37.0	583.5	92.4	22.9	1.000008
85500.0	23.3	-48.3	0.	-0. **	36.1	583.9	91.9	25.1	1.000008
86000.0	22.7	-48.1	0.	-0. **	35.2	584.2	91.5	27.2	1.000008
86500.0	22.2	-47.8	0.	-0. **	34.4	584.5	91.6	29.2	1.000008
87000.0	21.7	-47.1	0.	-0. **	33.5	585.4	93.9	30.5	1.000007
87500.0	21.2	-46.2	0.	-0. **	32.6	586.6	96.1	31.8	1.000007
88000.0	20.8	-45.2	0.	-0. **	31.7	587.9	96.6	32.7	1.000007
88500.0	20.3	-44.2	0.	-0. **	30.9	589.2	94.9	32.9	1.000007
89000.0	19.8	-43.6	0.	-0. **	30.1	590.0	93.1	33.1	1.000007
89500.0	19.4	-43.5	0.	-0. **	29.4	590.0	91.5	32.5	1.000007
90000.0	19.0	-43.5	0.	-0. **	28.8	590.1	90.0	31.3	1.000006
90500.0	18.5	-43.4	0.	-0. **	28.1	590.2	88.5	30.1	1.000006
91000.0	18.1	-43.4	0.	-0. **	27.5	590.2	86.5	29.5	1.000006
91500.0	17.7	-43.3	0.	-0. **	26.9	590.3	84.4	29.1	1.000006
92000.0	17.3	-43.3	0.	-0. **	26.3	590.3	82.3	28.7	1.000006
92500.0	17.0	-43.2	0.	-0. **	25.7	590.4	83.1	28.7	1.000006
93000.0	16.6	-43.2	0.	-0. **	25.1	590.5	84.6	28.7	1.000006

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 1445 HRS MST  
ASCENSION NO. 541

UPPER AIR DATA  
3919906  
WHITE SANDS SITE  
TABLE VII (Cont)

WSTM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
93500.0	16.2	-43.1	0.	-0. **	24.6	590.5	86.1	28.7	1.000005
94000.0	15.8	-43.1	0.	-0. **	24.0	590.6	87.6	29.7	1.000005
94500.0	15.5	-43.0	0.	-0. **	23.5	590.7	89.2	30.7	1.000005
95000.0	15.2	-43.0	0.	-0. **	22.9	590.7	90.7	31.7	1.000005
95500.0	14.8	-42.9	0.	-0. **	22.4	590.8	91.2	32.4	1.000005
96000.0	14.5	-42.9	0.	-0. **	21.9	590.9	91.6	33.1	1.000005
96500.0	14.2	-42.6	0.	-0. **	21.4	591.3	92.0	33.5	1.000005
97000.0	13.9	-42.3	0.	-0. **	20.9	591.7	92.0	32.8	1.000005
97500.0	13.6	-41.9	0.	-0. **	20.4	592.1	92.0	32.1	1.000005
98000.0	13.3	-41.6	0.	-0. **	20.0	592.5	92.0	31.2	1.000004
98500.0	13.0	-41.3	0.	-0. **	19.5	592.9	92.0	29.9	1.000004
99000.0	12.7	-41.0	0.	-0. **	19.0	593.3	92.0	28.6	1.000004
99500.0	12.4	-40.7	0.	-0. **	18.6	593.7	92.5	27.4	1.000004
100000.0	12.1	-40.4	0.	-0. **	18.2	594.1	93.9	26.3	1.000004
100500.0	11.9	-40.0	0.	-0. **	17.7	594.5	95.3	25.2	1.000004
101000.0	11.6	-39.7	0.	-0. **	17.3	594.9	96.1	24.2	1.000004
101500.0	11.4	-39.4	0.	-0. **	16.9	595.3	96.3	23.4	1.000004
102000.0	11.1	-39.1	0.	-0. **	16.5	595.7	96.5	22.5	1.000004
102500.0	10.9	-38.8	0.	-0. **	16.2	596.1	96.7	21.7	1.000004
103000.0	10.6	-38.5	0.	-0. **	15.8	596.5	96.8	21.0	1.000004
103500.0	10.4	-38.1	0.	-0. **	15.4	596.9	97.0	20.3	1.000003
104000.0	10.2	-37.8	0.	-0. **	15.1	597.3	91.6	19.9	1.000003
104500.0	9.9	-37.5	0.	-0. **	14.7	597.7	83.3	19.7	1.000003
105000.0	9.7	-37.1	0.	-0. **	14.4	598.2	74.9	19.4	1.000003
105500.0	9.5	-36.7	0.	-0. **	14.0	598.8	69.5	20.3	1.000003
106000.0	9.3	-36.2	0.	-0. **	13.7	599.4	64.8	21.4	1.000003
106500.0	9.1	-35.7	0.	-0. **	13.4	600.0	60.5	22.6	1.000003
107000.0	8.9	-35.2	0.	-0. **	13.1	600.6	62.5	25.1	1.000003
107500.0	8.7	-34.7	0.	-0. **	12.8	601.2	64.4	27.7	1.000003
108000.0	8.6	-34.2	0.	-0. **	12.5	601.9	67.4	30.3	1.000003

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

UPPER AIR DATA  
3919906  
WHITE SANDS SITE  
TABLE VII (Cont)

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 1445 HRS MST  
ASCENSION NO. 541

WSTM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
108500.0	8.4	-33.7	0.	-0. **	12.2	602.5		72.4	33.0	1.000003
109000.0	8.2	-33.3	0.	-0. **	11.9	603.1		77.4	35.7	1.000003
109500.0	8.0	-32.8	0.	-0. **	11.6	603.7		81.1	38.7	1.000003
110000.0	7.9	-32.3	0.	-0. **	11.4	604.3		83.9	41.7	1.000003
110500.0	7.7	-31.8	0.	-0. **	11.1	604.9		86.7	44.8	1.000002
111000.0	7.5	-31.3	0.	-0. **	10.8	605.5				1.000002
111500.0	7.4	-30.8	0.	-0. **	10.6	606.1				1.000002
112000.0	7.2	-30.4	0.	-0. **	10.3	606.7				1.000002
112500.0	7.1	-29.9	0.	-0. **	10.1	607.3				1.000002
113000.0	6.9	-29.4	0.	-0. **	9.9	607.9				1.000002
113500.0	6.8	-28.9	0.	-0. **	9.6	608.5				1.000002

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 1730 HRS MST  
ASCENSION NO. 542

UPPER AIR DATA  
3919905  
WHITE SANDS SITE  
TABLE VIII

WSIM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
3989.0	876.2	34.4	13.3	28.0	986.1	685.1	0.	0.	0.	1.000281
4000.0	875.9	34.4	13.3	28.0	985.8	685.1	0.3	0.3	0.0	1.000281
4500.0	861.0	32.9	12.3	28.5	974.0	683.3	15.8	15.8	0.9	1.000275
5000.0	846.4	31.4	11.3	29.0	962.4	681.6	31.2	31.2	1.8	1.000269
5500.0	832.0	30.0	10.3	29.5	950.8	679.9	46.7	46.7	2.8	1.000264
6000.0	817.8	28.5	9.3	30.0	939.5	678.1	62.1	62.1	3.7	1.000258
6500.0	803.9	27.1	8.3	30.5	928.3	676.4	77.5	77.5	4.6	1.000253
7000.0	790.3	25.6	7.3	31.0	917.2	674.6	86.3	86.3	4.7	1.000248
7500.0	776.8	24.1	6.2	31.5	906.3	672.9	89.3	89.3	4.1	1.000243
8000.0	763.6	22.7	5.2	32.1	895.5	671.2	91.8	91.8	3.5	1.000238
8500.0	750.2	21.1	5.0	34.9	884.6	669.3	93.2	93.2	2.9	1.000235
9000.0	737.0	19.5	4.7	37.8	873.8	667.5	95.8	95.8	2.5	1.000232
9500.0	724.1	17.9	4.3	40.6	863.2	665.7	101.6	101.6	2.5	1.000230
10000.0	711.4	16.3	3.8	43.4	852.8	663.8	108.7	108.7	2.8	1.000226
10500.0	698.8	14.7	3.3	46.4	842.4	662.0	118.7	118.7	3.4	1.000223
11000.0	686.3	13.2	3.3	51.0	831.5	660.3	123.4	123.4	4.0	1.000221
11500.0	673.9	11.7	3.2	55.6	820.8	658.6	120.5	120.5	4.6	1.000219
12000.0	661.8	10.2	2.9	60.2	810.2	656.9	115.2	115.2	5.0	1.000216
12500.0	649.9	8.9	2.2	62.6	799.5	655.3	107.7	107.7	5.2	1.000212
13000.0	638.0	8.1	-0.4	55.1	787.5	654.2	97.3	97.3	5.9	1.000204
13500.0	626.3	7.4	-3.1	47.5	775.7	653.1	85.6	85.6	6.8	1.000196
14000.0	614.9	6.6	-5.8	40.9	764.0	652.0	76.6	76.6	8.9	1.000189
14500.0	603.5	5.7	-7.9	37.0	752.6	650.9	68.9	68.9	11.3	1.000184
15000.0	592.3	4.8	-10.2	33.0	741.2	649.7	66.3	66.3	14.5	1.000179
15500.0	581.3	3.9	-12.6	29.1	730.1	648.6	64.4	64.4	16.7	1.000174
16000.0	570.6	3.0	-15.1	25.1	719.1	647.4	63.5	63.5	17.9	1.000170
16500.0	560.0	2.1	-18.0	21.1	708.3	646.3	62.6	62.6	18.1	1.000165
17000.0	549.6	1.0	-13.4	33.5	697.4	645.2	61.9	61.9	17.7	1.000166
17500.0	539.2	-0.2	-9.3	50.2	686.8	644.0	60.9	60.9	16.0	1.000168
18000.0	529.1	-1.1	-13.2	39.5	676.4	642.8	59.9	59.9	14.1	1.000162

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 1730 HRS MST  
ASCENSION NO. 542

UPPER AIR DATA  
3919905  
WHITE SANDS SITE  
TABLE VIII (Cont)

WSTM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
18500.0	519.1	-2.1	-13.3	42.3	666.2	641.6		59.5	12.8	1.000160
19000.0	509.2	-3.3	-10.2	59.0	656.2	640.3		59.3	11.4	1.000161
19500.0	499.5	-4.4	-10.1	64.7	646.2	639.0		60.0	9.9	1.000159
20000.0	489.9	-5.3	-12.4	57.6	636.1	637.9		61.9	8.7	1.000154
20500.0	480.6	-6.1	-14.8	50.4	626.1	636.7		65.4	8.0	1.000150
21000.0	471.3	-7.4	-14.8	55.6	616.8	635.3		67.8	7.8	1.000148
21500.0	462.1	-8.6	-14.8	61.6	607.7	633.8		69.8	7.8	1.000146
22000.0	453.2	-9.9	-14.8	67.5	598.8	632.3		77.7	8.1	1.000144
22500.0	444.3	-10.8	-17.7	57.3	589.4	631.1		86.4	8.3	1.000140
23000.0	435.6	-11.5	-21.4	44.1	579.6	630.1		96.0	7.9	1.000135
23500.0	427.1	-11.9	-23.7	37.2	569.2	629.6		105.5	7.4	1.000132
24000.0	418.7	-12.4	-26.4	30.2	559.0	629.0		114.9	6.9	1.000128
24500.0	410.3	-13.2	-28.0	27.9	549.7	627.9		122.5	6.5	1.000126
25000.0	402.0	-14.4	-29.1	27.7	541.0	626.6		129.0	6.1	1.000124
25500.0	393.9	-15.5	-30.1	27.5	532.4	625.2		126.3	6.1	1.000121
26000.0	386.0	-16.6	-31.2	27.3	523.9	623.9		120.1	6.1	1.000119
26500.0	378.2	-17.7	-32.2	27.1	515.6	622.5		115.3	6.7	1.000117
27000.0	370.6	-18.8	-33.3	26.9	507.4	621.1		110.7	7.3	1.000115
27500.0	363.1	-19.9	-34.3	26.7	499.4	619.8		105.9	8.7	1.000113
28000.0	355.8	-21.0	-35.3	26.5	491.5	618.4		101.8	10.1	1.000111
28500.0	348.6	-22.1	-36.4	26.3	483.7	617.1		100.7	11.7	1.000109
29000.0	341.6	-23.2	-37.4	26.2	476.1	615.7		98.8	13.2	1.000108
29500.0	334.7	-24.3	-38.4	26.4	468.6	614.3		94.6	14.7	1.000106
30000.0	327.7	-25.7	-38.9	28.3	461.2	612.6		90.6	15.8	1.000104
30500.0	320.8	-27.0	-39.4	30.2	454.0	611.0		86.7	16.3	1.000102
31000.0	314.1	-28.3	-40.0	32.1	446.9	609.3		83.0	16.5	1.000101
31500.0	307.5	-29.7	-40.7	34.0	439.9	607.6		79.5	16.5	1.000099
32000.0	301.1	-31.0	-41.4	35.9	433.1	606.0		77.9	16.5	1.000098
32500.0	294.8	-32.3	-42.1	37.8	426.4	604.3		78.4	16.6	1.000096
33000.0	288.4	-33.3	-43.6	35.2	419.0	603.0		79.7	16.5	1.000094

STATION ALTITUDE 3989.0 FEET MSL  
 18 JULY 66 1730 HRS MST  
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UPPER AIR DATA  
 3919905  
 WHITE SANDS SITE  
 TABLE VIII (Cont)

WSTM SITE COORDINATES  
 E 488,580 FEET  
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	TEMPERATURE DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
33500.0	282.2	-34.3	-45.4	32.1	411.6	601.8	81.7	16.1	1.000092
34000.0	276.2	-35.2	-47.1	28.9	404.4	600.6	83.5	15.6	1.000091
34500.0	270.2	-36.2	-49.0	25.7	397.3	599.4	85.0	15.1	1.000089
35000.0	264.4	-37.3	-51.4	21.8**	390.5	598.0	85.8	14.5	1.000087
35500.0	258.5	-38.7	-54.8	16.8**	384.2	596.2	84.9	13.5	1.000086
36000.0	252.9	-40.1	-58.8	11.8**	378.0	594.5	84.1	12.8	1.000084
36500.0	247.3	-41.4	-64.1	6.7**	371.9	592.7	83.4	13.1	1.000083
37000.0	241.9	-42.8	-74.5	1.7**	365.9	590.9	83.2	13.5	1.000081
37500.0	236.3	-44.0	0.	-0. **	359.4	589.4	85.3	14.2	1.000080
38000.0	230.9	-45.2	0.	-0. **	352.8	587.9	87.7	15.0	1.000079
38500.0	225.5	-46.3	0.	-0. **	346.3	586.4	91.4	15.6	1.000077
39000.0	220.2	-47.5	0.	-0. **	340.0	585.0	94.5	16.0	1.000076
39500.0	215.1	-48.6	0.	-0. **	333.8	583.5	95.4	15.1	1.000074
40000.0	210.1	-49.7	0.	-0. **	327.7	582.0	95.4	14.3	1.000073
40500.0	205.2	-50.9	0.	-0. **	321.7	580.5	91.5	13.7	1.000072
41000.0	200.5	-52.0	0.	-0. **	315.8	579.0	87.8	13.0	1.000070
41500.0	195.8	-53.1	0.	-0. **	310.1	577.6	84.8	12.4	1.000069
42000.0	191.3	-54.3	0.	-0. **	304.4	576.1	82.9	12.3	1.000068
42500.0	186.8	-55.4	0.	-0. **	298.9	574.6	82.5	13.0	1.000067
43000.0	182.5	-56.5	0.	-0. **	293.5	573.1	83.5	13.4	1.000065
43500.0	178.2	-57.7	0.	-0. **	288.2	571.6	86.9	13.5	1.000064
44000.0	174.1	-58.8	0.	-0. **	283.0	570.0	90.3	13.7	1.000063
44500.0	170.0	-60.0	0.	-0. **	277.9	568.5	93.9	13.8	1.000062
45000.0	166.1	-61.1	0.	-0. **	272.9	567.0	97.3	14.0	1.000061
45500.0	162.2	-62.2	0.	-0. **	268.0	565.5	99.8	13.9	1.000060
46000.0	158.2	-63.3	0.	-0. **	262.7	564.1	102.3	13.8	1.000059
46500.0	154.4	-64.3	0.	-0. **	257.5	562.7	102.4	14.1	1.000057
47000.0	150.6	-65.4	0.	-0. **	252.5	561.3	102.5	14.5	1.000056
47500.0	146.9	-66.4	0.	-0. **	247.5	559.9	100.1	16.1	1.000055
48000.0	143.3	-67.4	0.	-0. **	242.6	558.5	97.8	17.7	1.000054



STATION ALTITUDE 3989.0 FEET MSL  
 18 JULY 66 1730 HRS MST  
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UPPER AIR DATA  
 3919905  
 WHITE SANDS SITE  
 TABLE VIII (Cont)

WSTM SITE COORDINATES  
 E 488,580 FEET  
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	AIR TEMPERATURE DEGREES	DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
48500.0	139.7	-68.1	0.	-0. **	237.3	557.6	98.6	19.5	1.000053
49000.0	136.1	-68.5	0.	-0. **	231.8	557.0	99.8	21.2	1.000052
49500.0	132.7	-68.9	0.	-0. **	226.4	556.4	102.5	22.5	1.000050
50000.0	129.4	-69.4	0.	-0. **	221.2	555.8	106.9	22.7	1.000049
50500.0	126.1	-69.8	0.	-0. **	216.1	555.2	112.8	22.0	1.000048
51000.0	122.9	-70.2	0.	-0. **	211.1	554.7	116.4	21.5	1.000047
51500.0	119.8	-70.7	0.	-0. **	206.2	554.1	119.1	21.2	1.000046
52000.0	116.8	-71.1	0.	-0. **	201.4	553.5	119.4	21.4	1.000045
52500.0	113.8	-71.5	0.	-0. **	196.7	552.9	119.8	21.4	1.000044
53000.0	111.0	-72.0	0.	-0. **	192.2	552.3	120.5	20.6	1.000043
53500.0	108.2	-72.4	0.	-0. **	187.7	551.7	120.9	19.7	1.000042
54000.0	105.4	-72.8	0.	-0. **	183.4	551.1	117.5	18.2	1.000041
54500.0	102.8	-73.3	0.	-0. **	179.2	550.5	114.2	16.8	1.000040
55000.0	100.2	-72.6	0.	-0. **	174.0	551.5	111.3	15.4	1.000039
55500.0	97.6	-71.4	0.	-0. **	168.6	553.1	108.4	14.0	1.000038
56000.0	95.2	-70.2	0.	-0. **	163.3	554.7	105.1	14.0	1.000036
56500.0	92.8	-70.2	0.	-0. **	159.2	554.8	101.6	14.7	1.000035
57000.0	90.4	-70.2	0.	-0. **	155.2	554.7	99.4	15.1	1.000035
57500.0	88.1	-70.3	0.	-0. **	151.4	554.6	98.7	15.4	1.000034
58000.0	85.9	-70.3	0.	-0. **	147.6	554.5	96.7	15.5	1.000033
58500.0	83.8	-70.4	0.	-0. **	143.9	554.5	91.9	15.3	1.000032
59000.0	81.7	-67.4	0.	-0. **	138.3	558.5	86.5	15.3	1.000031
59500.0	79.7	-63.6	0.	-0. **	132.4	563.7	77.6	16.0	1.000029
60000.0	77.7	-63.3	0.	-0. **	129.1	564.0	68.7	16.7	1.000029
60500.0	75.8	-63.1	0.	-0. **	125.8	564.3	68.6	19.1	1.000028
61000.0	74.0	-62.9	0.	-0. **	122.7	564.6	68.8	21.4	1.000027
61500.0	72.2	-62.7	0.	-0. **	119.6	564.9	71.4	23.4	1.000027
62000.0	70.5	-62.5	0.	-0. **	116.5	565.2	74.8	25.3	1.000026
62500.0	68.8	-62.3	0.	-0. **	113.6	565.5	78.9	26.4	1.000025
63000.0	67.1	-62.0	0.	-0. **	110.7	565.8	83.8	26.8	1.000025

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
 18 JULY 66  
 ASCENSION NO. 542  
 UPPER AIR DATA  
 3919905  
 WHITE SANDS SITE  
 TABLE VIII (Cont)  
 WSTM SITE COORDINATES  
 E 488,580 FEET  
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
63500.0	65.5	-61.8	0.	-0. **	107.9	566.0	88.3	27.8	1.000024	
64000.0	63.9	-61.6	0.	-0. **	105.2	566.3	91.6	30.4	1.000023	
64500.0	62.3	-61.4	0.	-0. **	102.6	566.6	95.0	32.9	1.000023	
65000.0	60.8	-61.2	0.	-0. **	100.0	566.9	96.8	28.4	1.000022	
65500.0	59.4	-61.0	0.	-0. **	97.5	567.2	98.7	24.0	1.000022	
66000.0	57.9	-59.9	0.	-0. **	94.6	568.7	97.2	22.4	1.000021	
66500.0	56.6	-58.5	0.	-0. **	91.8	570.5	95.2	21.1	1.000020	
67000.0	55.2	-57.1	0.	-0. **	89.0	572.3	96.1	15.9	1.000020	
67500.0	53.9	-56.9	0.	-0. **	86.8	572.6	97.5	9.9	1.000019	
68000.0	52.6	-56.8	0.	-0. **	84.8	572.7	94.5	10.2	1.000019	
68500.0	51.4	-56.8	0.	-0. **	82.8	572.7	90.2	12.2	1.000018	
69000.0	50.2	-56.8	0.	-0. **	80.8	572.8	87.1	13.6	1.000018	
69500.0	49.0	-56.7	0.	-0. **	78.9	572.8	84.3	14.8	1.000018	
70000.0	47.8	-56.7	0.	-0. **	77.0	572.9	83.3	16.3	1.000017	
70500.0	46.7	-56.7	0.	-0. **	75.2	572.9	83.3	18.1	1.000017	
71000.0	45.6	-56.6	0.	-0. **	73.4	573.0	83.4	19.3	1.000016	
71500.0	44.5	-56.6	0.	-0. **	71.6	573.0	83.5	19.9	1.000016	
72000.0	43.5	-56.6	0.	-0. **	69.9	573.1	84.2	20.4	1.000016	
72500.0	42.5	-56.5	0.	-0. **	68.3	573.1	87.2	20.6	1.000015	
73000.0	41.5	-56.5	0.	-0. **	66.7	573.1	90.3	20.8	1.000015	
73500.0	40.5	-56.5	0.	-0. **	65.1	573.2	90.3	21.7	1.000014	
74000.0	39.5	-56.4	0.	-0. **	63.5	573.2	89.8	22.7	1.000014	
74500.0	38.6	-56.2	0.	-0. **	62.0	573.6	89.7	23.8	1.000014	
75000.0	37.7	-55.7	0.	-0. **	60.4	574.2	90.2	25.0	1.000013	
75500.0	36.8	-55.2	0.	-0. **	58.9	574.8	90.7	26.1	1.000013	
76000.0	36.0	-54.7	0.	-0. **	57.4	575.5	89.7	26.5	1.000013	
76500.0	35.1	-54.2	0.	-0. **	55.9	576.1	88.7	26.9	1.000012	
77000.0	34.3	-53.7	0.	-0. **	54.5	576.8	88.6	27.5	1.000012	
77500.0	33.5	-53.2	0.	-0. **	53.1	577.4	89.1	28.3	1.000012	
78000.0	32.7	-52.7	0.	-0. **	51.8	578.1	89.7	29.1	1.000012	

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 1730 HRS MST  
ASCENSION NO. 542

UPPER AIR DATA  
3919905  
WHITE SANDS SITE  
TABLE VIII (Cont)

WSIM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	TEMPERATURE DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
78500.0	32.0	-52.2	0.	-0. **	50.4	578.7	90.7	30.3	1.000011
79000.0	31.2	-51.8	0.	-0. **	49.2	579.4	91.6	31.4	1.000011
79500.0	30.5	-51.3	0.	-0. **	47.9	580.0	92.2	32.4	1.000011
80000.0	29.8	-50.8	0.	-0. **	46.7	580.7	92.5	33.5	1.000010
80500.0	29.1	-50.3	0.	-0. **	45.5	581.3	92.2	34.2	1.000010
81000.0	28.5	-49.5	0.	-0. **	44.3	582.3	90.0	33.9	1.000010
81500.0	27.8	-48.7	0.	-0. **	43.2	583.3	87.8	33.7	1.000010
82000.0	27.2	-47.9	0.	-0. **	42.1	584.4	87.2	33.4	1.000009
82500.0	26.6	-47.1	0.	-0. **	41.0	585.4	87.2	33.1	1.000009
83000.0	26.0	-46.3	0.	-0. **	39.9	586.5	87.1	32.8	1.000009
83500.0	25.4	-45.5	0.	-0. **	38.9	587.5	87.0	32.0	1.000009
84000.0	24.8	-44.7	0.	-0. **	37.8	588.6	86.9	31.3	1.000008
84500.0	24.3	-43.9	0.	-0. **	36.9	589.6	87.1	30.5	1.000008
85000.0	23.7	-43.7	0.	-0. **	36.0	589.8	87.9	29.5	1.000008
85500.0	23.2	-44.1	0.	-0. **	35.3	589.3	88.7	28.5	1.000008
86000.0	22.7	-44.5	0.	-0. **	34.5	588.8	88.9	27.8	1.000008
86500.0	22.1	-44.9	0.	-0. **	33.8	588.3	88.9	27.2	1.000008
87000.0	21.7	-45.3	0.	-0. **	33.1	587.8	89.0	26.6	1.000007
87500.0	21.2	-45.7	0.	-0. **	32.4	587.3	89.6	25.7	1.000007
88000.0	20.7	-46.1	0.	-0. **	31.7	586.7	90.2	24.8	1.000007
88500.0	20.2	-46.5	0.	-0. **	31.1	586.2	91.4	24.1	1.000007
89000.0	19.8	-46.9	0.	-0. **	30.4	585.7	93.5	23.6	1.000007
89500.0	19.3	-47.3	0.	-0. **	29.8	585.2	95.6	23.0	1.000007
90000.0	18.9	-47.7	0.	-0. **	29.2	584.7	95.1	22.2	1.000006
90500.0	18.5	-48.1	0.	-0. **	28.6	584.2	93.8	21.3	1.000006
91000.0	18.1	-48.4	0.	-0. **	28.0	583.7	92.8	20.5	1.000006
91500.0	17.6	-48.1	0.	-0. **	27.3	584.1	94.6	20.3	1.000006
92000.0	17.3	-47.7	0.	-0. **	26.7	584.7	96.3	20.2	1.000006
92500.0	16.9	-47.2	0.	-0. **	26.0	585.3	96.5	20.4	1.000006
93000.0	16.5	-46.8	0.	-0. **	25.4	585.9	94.8	21.1	1.000006

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
 18 JULY 66 1730 HRS MST  
 ASCENSION NO. 542

UPPER AIR DATA  
 3919905  
 WHITE SANDS SITE  
 TABLE VIII (Cont)

WSTM SITE COORDINATES  
 E 488,580 FEET  
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	TEMPERATURE DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
93500.0	16.1	-46.3	0.	-0. **	24.8	586.5	93.1	21.8	1.000006
94000.0	15.8	-45.8	0.	-0. **	24.2	587.0	94.6	23.6	1.000005
94500.0	15.4	-45.4	0.	-0. **	23.6	587.6	96.9	25.8	1.000005
95000.0	15.1	-44.9	0.	-0. **	23.0	588.2	98.9	28.0	1.000005
95500.0	14.7	-44.5	0.	-0. **	22.4	588.8	96.9	29.4	1.000005
96000.0	14.4	-44.0	0.	-0. **	21.9	589.4	95.0	30.9	1.000005
96500.0	14.1	-43.6	0.	-0. **	21.4	590.0	94.2	33.0	1.000005
97000.0	13.8	-43.1	0.	-0. **	20.8	590.5	94.9	36.1	1.000005
97500.0	13.5	-42.7	0.	-0. **	20.3	591.1	95.6	39.1	1.000005
98000.0	13.2	-42.2	0.	-0. **	19.8	591.7			1.000004
98500.0	12.9	-41.2	0.	-0. **	19.3	593.1			1.000004
99000.0	12.6	-39.5	0.	-0. **	18.8	595.2			1.000004
99500.0	12.3	-37.8	0.	-0. **	18.2	597.4			1.000004
100000.0	12.0	-36.1	0.	-0. **	17.7	599.6			1.000004

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 2045 HRS MST  
ASCENSION NO. 544

UPPER AIR DATA  
3919907  
WHITE SANDS SITE  
TABLE IX

WSIM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			SPEED KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS		
3989.0	877.6	29.4	12.9	36.0	1004.2	679.4	120.0	5.1	1.000285	
4000.0	877.3	29.5	12.9	36.0	1003.6	679.5	120.2	5.1	1.000285	
4500.0	862.4	30.4	14.5	37.8	982.6	680.9	130.1	6.7	1.000287	
5000.0	847.7	29.2	14.0	39.4	970.1	679.4	140.0	8.2	1.000282	
5500.0	833.3	27.9	13.5	40.9	957.7	677.9	149.9	9.8	1.000278	
6000.0	819.1	26.6	12.9	42.5	945.6	676.4	159.8	11.4	1.000273	
6500.0	805.1	25.3	12.3	44.0	933.6	674.9	167.8	11.3	1.000269	
7000.0	791.4	24.0	11.6	45.6	921.8	673.4	174.7	10.5	1.000264	
7500.0	777.6	22.7	11.0	47.5	910.1	671.8	177.4	10.2	1.000260	
8000.0	764.0	21.3	10.4	49.6	898.4	670.2	179.8	9.6	1.000255	
8500.0	750.6	19.9	9.7	51.6	886.9	668.6	181.6	8.8	1.000251	
9000.0	737.4	18.5	9.0	53.7	875.6	667.0	183.5	7.6	1.000246	
9500.0	724.4	17.2	8.3	55.7	864.5	665.3	185.5	6.2	1.000242	
10000.0	711.7	15.8	7.5	57.8	853.5	663.7	184.4	4.1	1.000237	
10500.0	699.2	14.4	6.7	59.8	842.7	662.0	177.7	1.9	1.000233	
11000.0	686.9	13.3	5.6	59.3	831.1	660.7	93.8	1.9	1.000227	
11500.0	674.5	12.4	4.5	58.3	819.2	659.5	29.3	2.3	1.000222	
12000.0	662.4	11.0	3.9	61.4	808.4	657.9	25.1	3.8	1.000218	
12500.0	650.4	9.7	3.6	65.5	797.6	656.3	21.9	4.8	1.000215	
13000.0	638.6	8.4	3.4	70.8	786.7	654.8	20.0	5.5	1.000213	
13500.0	627.0	7.0	3.1	76.1	776.1	653.3	19.8	6.3	1.000210	
14000.0	615.5	5.3	1.9	78.5	766.8	651.2	21.0	7.2	1.000205	
14500.0	604.1	3.7	1.7	86.5	756.8	649.3	24.5	8.2	1.000203	
15000.0	592.9	2.2	1.4	94.6	747.1	647.5	29.9	9.2	1.000200	
15500.0	581.8	1.2	-0.2	90.7	736.0	646.2	36.0	10.1	1.000194	
16000.0	571.0	0.4	-2.3	82.6	724.9	645.1	42.4	10.9	1.000188	
16500.0	560.2	-0.5	-5.2	70.6	714.0	643.8	49.7	11.5	1.000180	
17000.0	549.7	-1.4	-6.6	68.0	703.0	642.7	55.9	12.1	1.000176	
17500.0	539.3	-2.2	-9.2	59.1	692.0	641.6	59.5	12.7	1.000170	
18000.0	529.0	-3.2	-13.0	47.1	681.8	640.2	61.4	13.6	1.000164	

UPPER AIR DATA  
3919907  
WHITE SANDS SITE  
TABLE IX (Cont)

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 2045 HRS MST  
ASCENSION NO. 544

WSTM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS			
18500.0	519.0	-4.1	-15.7	40.3	671.3	639.0	62.4	62.4	14.7	1.000159
19000.0	509.0	-4.6	-15.9	41.3	659.7	638.5	65.9	65.9	15.3	1.000156
19500.0	499.3	-5.3	-16.0	43.0	648.5	637.7	70.2	70.2	15.7	1.000154
20000.0	489.7	-6.3	-15.9	46.6	638.4	636.6	74.9	74.9	16.1	1.000152
20500.0	480.2	-7.2	-15.9	50.2	628.4	635.4	79.7	79.7	16.5	1.000150
21000.0	471.0	-8.3	-15.3	57.3	618.6	634.2	88.9	88.9	16.8	1.000148
21500.0	461.8	-9.6	-12.9	77.2	609.3	632.8	96.4	96.4	17.1	1.000148
22000.0	452.8	-10.7	-12.3	88.2	599.9	631.5	99.3	99.3	17.4	1.000147
22500.0	444.0	-11.4	-13.8	83.1	590.0	630.5	102.1	102.1	17.2	1.000143
23000.0	435.3	-11.2	-17.2	61.5	578.2	630.6	104.6	104.6	16.8	1.000138
23500.0	426.7	-10.9	-22.3	38.9	566.4	630.9	103.8	103.8	15.1	1.000132
24000.0	418.4	-11.5	-23.0	38.1	556.6	630.1	104.8	104.8	13.4	1.000129
24500.0	410.1	-12.5	-24.0	37.8	547.7	628.9	108.6	108.6	11.6	1.000127
25000.0	402.0	-13.5	-25.0	37.5	539.0	627.7	113.7	113.7	10.9	1.000125
25500.0	394.1	-14.5	-26.0	37.2	530.5	626.4	119.4	119.4	10.6	1.000122
26000.0	386.2	-15.6	-27.1	37.0	522.0	625.1	123.7	123.7	11.4	1.000120
26500.0	378.2	-16.8	-28.2	36.9	513.7	623.7	127.9	127.9	12.3	1.000118
27000.0	370.5	-18.0	-29.3	36.8	505.5	622.2	128.8	128.8	12.6	1.000116
27500.0	362.8	-19.2	-30.4	36.8	497.5	620.7	129.2	129.2	12.9	1.000114
28000.0	355.4	-20.4	-31.5	36.7	489.6	619.2	127.3	127.3	12.7	1.000112
28500.0	348.0	-21.6	-32.6	36.6	481.8	617.7	125.0	125.0	12.5	1.000110
29000.0	340.9	-22.8	-33.7	36.6	474.2	616.2	120.4	120.4	12.7	1.000108
29500.0	333.9	-24.0	-34.8	36.5	466.6	614.8	115.6	115.6	13.0	1.000106
30000.0	327.0	-25.2	-35.9	36.4	459.3	613.3	112.2	112.2	14.2	1.000104
30500.0	320.2	-26.4	-37.0	36.4	452.0	611.8	108.9	108.9	15.4	1.000102
31000.0	313.7	-27.6	-38.1	36.3	444.9	610.3	108.2	108.2	16.6	1.000101
31500.0	307.2	-28.8	-39.2	36.2	437.9	608.8	107.4	107.4	17.7	1.000099
32000.0	300.9	-30.0	-40.4	36.1	431.0	607.3	104.9	104.9	17.4	1.000097
32500.0	294.7	-31.2	-41.5	36.1	424.2	605.8	102.0	102.0	17.0	1.000096
33000.0	288.6	-32.4	-42.6	36.0	417.6	604.2	95.9	95.9	16.6	1.000094

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 2045 HRS MST  
ASCENSION NO. 544

UPPER AIR DATA  
3919907  
WHITE SANDS SITE  
TABLE IX (Cont)

WSIM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	TEMPERATURE DEWPOINT CENTIGRADE	RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
33500.0	282.4	-33.5	-43.6	36.1	410.5	602.8	88.6	16.2	1.000092
34000.0	276.3	-34.7	-44.6	36.3	403.6	601.3	78.0	15.8	1.000091
34500.0	270.3	-35.8	-45.6	36.4	396.8	599.9	69.8	16.0	1.000089
35000.0	264.4	-37.0	-46.6	36.5	390.1	598.4	64.0	16.9	1.000087
35500.0	258.7	-38.2	-47.7	36.7	383.5	596.9	60.2	17.2	1.000086
36000.0	253.1	-39.3	-48.7	36.8	377.0	595.5	57.8	17.1	1.000084
36500.0	247.6	-40.5	-49.7	37.0	370.7	594.0	58.0	16.8	1.000083
37000.0	242.1	-41.6	-51.6	37.6**	364.2	592.5	61.0	16.2	1.000081
37500.0	236.6	-42.8	-53.9	28.9**	357.8	591.0	65.8	15.6	1.000080
38000.0	231.3	-43.9	-56.4	24.2**	351.6	589.5	73.2	15.0	1.000078
38500.0	226.1	-45.1	-59.1	19.4**	345.4	588.1	80.7	14.8	1.000077
39000.0	221.0	-46.2	-62.2	14.7**	339.3	586.6	88.7	15.2	1.000076
39500.0	216.0	-47.4	-66.1	9.9**	333.4	585.1	95.1	15.6	1.000074
40000.0	211.2	-48.5	-71.5	5.2**	327.6	583.6	98.4	16.1	1.000073
40500.0	206.4	-49.7	-87.4	0.4**	321.9	582.1	101.0	16.5	1.000072
41000.0	201.6	-50.9	0.	-0. **	316.0	580.4	100.7	16.8	1.000070
41500.0	196.8	-52.2	0.	-0. **	310.3	578.8	100.2	17.1	1.000069
42000.0	192.2	-53.4	0.	-0. **	304.7	577.2	98.1	17.5	1.000068
42500.0	187.6	-54.7	0.	-0. **	299.2	575.5	95.9	17.8	1.000067
43000.0	183.2	-55.9	0.	-0. **	293.8	573.9	94.9	18.3	1.000065
43500.0	178.8	-57.2	0.	-0. **	288.5	572.3	94.3	18.8	1.000064
44000.0	174.6	-58.4	0.	-0. **	283.3	570.6	96.0	19.2	1.000063
44500.0	170.5	-59.6	0.	-0. **	278.2	569.0	98.9	19.4	1.000062
45000.0	166.4	-60.9	0.	-0. **	273.2	567.3	102.9	19.9	1.000061
45500.0	162.5	-62.1	0.	-0. **	268.3	565.6	107.4	20.4	1.000060
46000.0	158.7	-63.4	0.	-0. **	263.5	564.0	111.5	21.3	1.000059
46500.0	154.8	-64.2	0.	-0. **	258.1	562.9	115.4	22.5	1.000057
47000.0	151.0	-64.9	0.	-0. **	252.5	561.9	117.3	23.9	1.000056
47500.0	147.2	-65.6	0.	-0. **	247.1	561.0	118.5	25.5	1.000055
48000.0	143.6	-66.3	0.	-0. **	241.9	560.1	121.2	27.1	1.000054

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

# UPPER AIR DATA

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66  
ASCENSION NO. 544

3919907  
WHITE SANDS SITE  
TABLE IX (Cont)

WSTM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
48500.0	140.1	-67.0	0.	-0. **	236.7	559.1		124.4	28.8	1.000053
49000.0	136.6	-67.7	0.	-0. **	231.6	558.2		127.7	29.4	1.000052
49500.0	133.2	-68.1	0.	-0. **	226.3	557.6		130.9	29.8	1.000050
50000.0	129.9	-68.3	0.	-0. **	220.9	557.3		132.6	27.2	1.000049
50500.0	126.6	-68.5	0.	-0. **	215.5	557.1		134.3	24.6	1.000048
51000.0	123.5	-68.6	0.	-0. **	210.3	556.8		134.4	21.8	1.000047
51500.0	120.4	-68.8	0.	-0. **	205.3	556.6		134.5	19.0	1.000046
52000.0	117.4	-69.0	0.	-0. **	200.3	556.3		129.0	16.3	1.000045
52500.0	114.4	-69.2	0.	-0. **	195.5	556.1		122.6	13.7	1.000044
53000.0	111.6	-69.4	0.	-0. **	190.7	555.8		121.6	12.7	1.000042
53500.0	108.8	-69.5	0.	-0. **	186.1	555.6		123.2	12.4	1.000041
54000.0	106.0	-70.3	0.	-0. **	182.2	554.5		122.2	11.1	1.000041
54500.0	103.4	-71.4	0.	-0. **	178.5	553.1		119.3	9.1	1.000040
55000.0	100.7	-71.6	0.	-0. **	174.2	552.7		119.4	7.9	1.000039
55500.0	98.2	-71.8	0.	-0. **	169.9	552.5		121.8	7.4	1.000038
56000.0	95.7	-72.0	0.	-0. **	165.7	552.3		122.2	7.0	1.000037
56500.0	93.3	-72.1	0.	-0. **	161.6	552.1		107.6	7.1	1.000036
57000.0	90.9	-72.3	0.	-0. **	157.7	551.8		93.1	7.3	1.000035
57500.0	88.6	-72.5	0.	-0. **	153.8	551.6		80.7	8.3	1.000034
58000.0	86.3	-72.6	0.	-0. **	150.0	551.4		74.4	11.8	1.000033
58500.0	84.1	-72.8	0.	-0. **	146.3	551.2		68.0	15.3	1.000033
59000.0	82.0	-63.0	0.	-0. **	136.0	564.5		64.7	18.6	1.000030
59500.0	80.0	-63.0	0.	-0. **	132.7	564.5		62.7	21.6	1.000030
60000.0	78.1	-63.2	0.	-0. **	129.6	564.2		62.0	24.1	1.000029
60500.0	76.2	-63.4	0.	-0. **	126.5	563.9		62.2	26.0	1.000028
61000.0	74.3	-63.6	0.	-0. **	123.6	563.7		67.1	27.1	1.000028
61500.0	72.5	-63.8	0.	-0. **	120.7	563.4		75.4	27.4	1.000027
62000.0	70.7	-64.0	0.	-0. **	117.9	563.1		82.3	27.5	1.000026
62500.0	69.0	-64.2	0.	-0. **	115.1	562.9		88.3	27.3	1.000026
63000.0	67.4	-63.3	0.	-0. **	111.9	564.0		95.4	27.4	1.000025

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.



STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 2045 HRS MST  
ASCENSION NO. 544

UPPER AIR DATA  
3919907  
WHITE SANDS SITE  
TABLE IX (Cont)

WSIM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(TN)	SPEED KNOTS	
63500.0	65.8	-62.4	0.	-0. **	108.7	565.3		103.6	27.6	1.000024
64000.0	64.2	-61.5	0.	-0. **	105.7	566.5		109.6	27.4	1.000024
64500.0	62.6	-60.6	0.	-0. **	102.7	567.7		111.8	26.2	1.000023
65000.0	61.1	-59.7	0.	-0. **	99.8	568.9		113.0	24.9	1.000022
65500.0	59.7	-58.8	0.	-0. **	97.0	570.1		109.4	23.0	1.000022
66000.0	58.2	-57.9	0.	-0. **	94.3	571.2		105.8	21.2	1.000021
66500.0	56.8	-57.0	0.	-0. **	91.6	572.4		98.7	19.9	1.000020
67000.0	55.5	-56.1	0.	-0. **	89.1	573.6		91.4	18.7	1.000020
67500.0	54.2	-56.0	0.	-0. **	86.9	573.8		83.7	17.7	1.000019
68000.0	52.9	-56.3	0.	-0. **	85.0	573.4		75.9	16.8	1.000019
68500.0	51.6	-56.6	0.	-0. **	83.1	573.0		71.6	16.9	1.000018
69000.0	50.4	-56.9	0.	-0. **	81.2	572.7		70.3	18.0	1.000018
69500.0	49.2	-57.1	0.	-0. **	79.4	572.3		69.7	18.9	1.000018
70000.0	48.1	-57.4	0.	-0. **	77.6	571.9		70.4	19.6	1.000017
70500.0	46.9	-57.7	0.	-0. **	75.9	571.5		71.9	20.6	1.000017
71000.0	45.8	-58.0	0.	-0. **	74.2	571.1		75.7	22.5	1.000017
71500.0	44.7	-58.3	0.	-0. **	72.5	570.7		79.5	24.4	1.000016
72000.0	43.7	-58.3	0.	-0. **	70.8	570.7		83.1	26.2	1.000016
72500.0	42.7	-57.7	0.	-0. **	69.0	571.5		86.7	28.0	1.000015
73000.0	41.7	-57.2	0.	-0. **	67.2	572.3		88.1	29.8	1.000015
73500.0	40.7	-56.6	0.	-0. **	65.5	573.0		89.4	31.6	1.000015
74000.0	39.7	-56.0	0.	-0. **	63.8	573.8		89.2	32.9	1.000014
74500.0	38.8	-55.4	0.	-0. **	62.1	574.6		88.8	34.2	1.000014
75000.0	37.9	-54.8	0.	-0. **	60.5	575.3		89.1	34.1	1.000013
75500.0	37.0	-54.3	0.	-0. **	58.9	576.1		89.7	33.4	1.000013
76000.0	36.2	-53.7	0.	-0. **	57.4	576.8		89.8	33.0	1.000013
76500.0	35.3	-53.1	0.	-0. **	55.9	577.6		89.6	32.8	1.000012
77000.0	34.5	-52.5	0.	-0. **	54.5	578.4		89.6	32.0	1.000012
77500.0	33.7	-51.9	0.	-0. **	53.1	579.1		90.0	30.3	1.000012
78000.0	32.9	-51.4	0.	-0. **	51.7	579.9		90.4	28.6	1.000012

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

# UPPER AIR DATA

STATION ALTITUDE 3989.0 FEET MSL  
18 JULY 66 2045 HRS MST  
ASCENSION NO. 544

3919907  
WHITE SANDS SITE  
TABLE IX (Cont)

WSIM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE M"LLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DIRECTION DEGREES(TN)	WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS		SPEED KNOTS	REFLECTION	
78500.0	32.1	-50.8	0.	-0.	50.4	580.6	90.5	90.5	26.7	1.000011	
79000.0	31.4	-50.2	0.	-0.	49.1	581.4	90.6	90.6	24.9	1.000011	
79500.0	30.7	-49.9	0.	-0.	47.9	581.8	88.7	88.7	23.5	1.000011	
80000.0	30.0	-49.8	0.	-0.	46.7	581.9	86.5	86.5	22.2	1.000010	
80500.0	29.3	-49.7	0.	-0.	45.7	582.0	84.7	84.7	21.9	1.000010	
81000.0	28.6	-49.6	0.	-0.	44.6	582.1	83.2	83.2	22.4	1.000010	
81500.0	28.0	-49.6	0.	-0.	43.6	582.2	82.5	82.5	23.5	1.000010	
82000.0	27.3	-49.5	0.	-0.	42.6	582.3	83.5	83.5	25.8	1.000009	
82500.0	26.7	-49.4	0.	-0.	41.6	582.4	84.7	84.7	28.2	1.000009	
83000.0	26.1	-49.4	0.	-0.	40.6	582.5	89.1	89.1	29.4	1.000009	
83500.0	25.5	-49.3	0.	-0.	39.7	582.6	93.6	93.6	30.6	1.000009	
84000.0	24.9	-49.2	0.	-0.	38.8	582.7	94.7	94.7	31.0	1.000009	
84500.0	24.4	-49.1	0.	-0.	37.9	582.8	94.5	94.5	31.2	1.000008	
85000.0	23.8	-49.1	0.	-0.	37.0	582.9	94.1	94.1	31.2	1.000008	
85500.0	23.3	-49.0	0.	-0.	36.1	583.0	93.5	93.5	31.0	1.000008	
86000.0	22.7	-48.9	0.	-0.	35.3	583.1	92.5	92.5	31.1	1.000008	
86500.0	22.2	-48.8	0.	-0.	34.5	583.2	89.8	89.8	32.4	1.000008	
87000.0	21.7	-48.8	0.	-0.	33.7	583.3	87.0	87.0	33.8	1.000007	
87500.0	21.2	-48.7	0.	-0.	32.9	583.4	86.0	86.0	34.6	1.000007	
88000.0	20.7	-48.6	0.	-0.	32.2	583.5	85.3	85.3	35.3	1.000007	
88500.0	20.3	-48.5	0.	-0.	31.4	583.6	84.1	84.1	35.2	1.000007	
89000.0	19.8	-48.3	0.	-0.	30.7	583.9	82.5	82.5	34.5	1.000007	
89500.0	19.4	-47.8	0.	-0.	29.9	584.6	80.3	80.3	33.6	1.000007	
90000.0	18.9	-47.3	0.	-0.	29.2	585.2	75.9	75.9	32.3	1.000006	
90500.0	18.5	-46.8	0.	-0.	28.5	585.9	71.4	71.4	31.0	1.000006	
91000.0	18.1	-46.3	0.	-0.	27.8	586.5	69.2	69.2	31.0	1.000006	
91500.0	17.7	-45.8	0.	-0.	27.1	587.2	67.5	67.5	31.2	1.000006	
92000.0	17.3	-45.3	0.	-0.	26.5	587.8	67.4	67.4	32.2	1.000006	
92500.0	16.9	-44.8	0.	-0.	25.8	588.4	69.1	69.1	33.9	1.000006	
93000.0	16.5	-44.3	0.	-0.	25.2	589.1	71.3	71.3	35.8	1.000006	

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
 18 JULY 66 2045 HRS MST  
 ASCENSION NO. 544

UPPER AIR DATA  
 3919907  
 WHITE SANDS SITE  
 TABLE IX (Cont)

WSTM SITE COORDINATES  
 E 488,580 FEET  
 N 185,045 FEET

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE		RELATIVE HUMIDITY PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND		WIND DATA		INDEX OF REFRACTION
		AIR DEGREES	DEWPOINT CENTIGRADE			KNOTS	KNOTS	DIRECTION DEGREES(IN)	SPEED KNOTS	
93500.0	16.2	-43.8	0.	-0. **	24.6	589.7		75.9	38.5	1.000005
94000.0	15.8	-43.3	0.	-0. **	24.0	590.4		80.5	41.2	1.000005
94500.0	15.5	-42.8	0.	-0. **	23.4	591.0		83.7	40.7	1.000005
95000.0	15.1	-42.3	0.	-0. **	22.8	591.7		86.8	39.8	1.000005
95500.0	14.8	-41.8	0.	-0. **	22.3	592.3		87.4	38.0	1.000005
96000.0	14.5	-41.3	0.	-0. **	21.7	592.9		86.9	35.7	1.000005
96500.0	14.1	-40.8	0.	-0. **	21.2	593.6		86.6	33.0	1.000005
97000.0	13.8	-40.3	0.	-0. **	20.7	594.2		86.7	29.7	1.000005
97500.0	13.5	-39.8	0.	-0. **	20.2	594.9				1.000004
98000.0	13.2	-39.3	0.	-0. **	19.7	595.5				1.000004
98500.0	12.9	-38.7	0.	-0. **	19.2	596.1				1.000004
99000.0	12.6	-38.2	0.	-0. **	18.7	596.8				1.000004

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

RELEASE TIME (MST)			IMPACT DISPLACEMENT IN MILES DUE TO WIND								THEORETICAL IMPACT IN MILES FROM LAUNCHER			
			143- 4000 FT				4000- 20000 FT						20000- 100000 FT	
			RAWINSONDE		PTBAL	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S
R <sub>1</sub> 1445	R 1445	P 1745	6.2S	9.2E	2.0N	5.6E	1.0S	7.9E	5.2S	22.7E	66.2N	11.4W		
R <sub>1</sub> 1445	R 1445	P 1805	6.0S	9.9E	2.0N	5.6E	1.0S	7.9E	5.0S	23.4E	66.4N	10.7W		
R <sub>1</sub> 1730	R 1445	P 1835	14.7S	16.1E	1.1N	5.4E	1.0S	7.9E	14.6S	29.4E	56.8N	4.7W		
R <sub>1</sub> 1730	R 1445	P 1855	16.6S	11.7E	1.1N	5.4E	1.0S	7.9E	16.5S	25.0E	54.9N	9.1W		
R <sub>1</sub> 1730	R 1730	P 1920	17.5S	19.8E	1.1N	5.4E	0.6S	7.5E	17.0S	32.7E	54.4N	1.4W		
R <sub>1</sub> 1730	R 1730	P 1935	21.5S	23.0E	1.1N	5.4E	0.6S	7.5E	21.0S	35.9E	50.4N	1.8E		
R <sub>1</sub> 1730	R 1730	P 1950	20.8S	22.0E	1.1N	5.4E	0.6S	7.5E	20.3S	34.9E	51.1N	0.8E		
R <sub>1</sub> 1730	R 1730	P 2005	23.3S	22.3E	1.1N	5.4E	0.6S	7.5E	22.8S	35.2E	48.6N	1.1E		
R <sub>1</sub> 1945	R 1730	P 2018	25.0S	22.7E	4.8N	1.5E	0.6S	7.5E	20.8S	31.7E	50.6N	2.4W		
R <sub>1</sub> 1945	R 1730	P 2025	27.8S	20.7E	4.8N	1.5E	0.6S	7.5E	23.6S	29.7E	47.8N	4.4W		
R <sub>1</sub> 1945	R 1730	P 2030	28.5S	22.2E	4.8N	1.5E	0.6S	7.5E	24.3S	31.2E	47.1N	2.9W		
*R <sub>1</sub> 2045	*R 2045	*P 2037	27.6S	24.8E	0.9N	6.1E	1.2S	8.4E	27.9S	39.3E	43.5N	5.2E		

\* = Post-Shoot Data  
 P = Double Theodolite Winds (143-4,000 FT)  
 R = Rawinsonde Winds Above 20,000 FT)  
 R<sub>1</sub> = Rawinsonde Winds (4,000-20,000 FT)

TABLE X. IMPACT PREDICTION DATA  
 AEROBEE NASA 4.144 DG  
 (NRL NB 3.165)

TIME: 2036 MST  
 DATE: 18 JULY 1966

JACK SETTINGS FOR LAUNCHER 21A	West leg	29	inches	PREDICTED IMPACT FROM LAUNCHER	North	48.0	miles
	East leg	47	inches		West	4.0	miles
LAUNCHER SETTING	Tilt	4.53	degrees	PREDICTED BOOSTER IMPACT FROM LAUNCHER	Azimuth	345	degrees
	Azimuth	337.7	degrees		Distance	1,615	feet
TILT COMPONENTS	North	4.19	degrees	RECOMMENDATION - Fire, with 90% confidence of impacting on range, based upon: wind correction of 35 miles 1-hr wind variability of 6.5 miles  18 July 1966/2026 MST			
	West	1.72	degrees				
NO WIND IMPACT FROM LAUNCHER	North	71.4	miles				
	West	34.1	miles				

TABLE XI. ACTUAL AND PREDICTED LAUNCH DATA  
AEROBEE NASA 4.144 DG (NRL NB 3.165)

SOTIM IMPACT FROM LAUNCHER	North	42.4	miles
	West	1.6	miles
ACTUAL BOOSTER IMPACT FROM LAUNCHER	Azimuth	N/A	degrees
	distance	N/A	feet

\*

TABLE XII. IMPACT DATA  
AEROBEE NASA 4.144 DG (NRL NB 3.165)

\* Sonic observation of trajectory and impact of missiles

UNCLASSIFIED

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11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY U. S. Army Electronics Command Atmospheric Sciences Laboratory White Sands Missile Range, New Mexico	
13. ABSTRACT Meteorological data gathered for the launching of Aerobee NASA 4.114 DG (NRL NB 3.165) are presented for the National Aeronautics and Space Administration and the U. S. Naval Research Laboratory and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form.		

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
1. Ballistics						
2. Meteorology						
3. Wind						

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